Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A fiber optic apparatus comprising:

a plurality of optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region, wherein the second end of the fibers are detached from each other; and

a facet, said facet being formed by cutting and polishing or by cleaving ~~or cut and polishing~~ said tapered region in a direction perpendicular to said fiber axis; said facet having a cross section other than approximately equal to the cross section of an individual single-mode fiber.

2. (previously presented) The apparatus of claim 28, wherein the plurality of optical fibers are arranged in an array, the array being selected from a member of the group consisting of hexagonal close packed arrays, square close packed arrays, and three-nearest neighbor packed arrays.

3. (previously presented) The apparatus of claim 28, wherein the plurality of optical fibers is provided in a glass matrix.

4. (previously presented) The apparatus of claim 28, wherein each optical fiber has a core diameter, the core diameter of each optical fiber in the tapered region being smaller than the core diameter of each optical fiber in a non-tapered region.

5. (currently amended) A fiber optic apparatus comprising:

a plurality of optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region; and

a facet, said facet being formed by cutting and polishing or by cleaving said tapered region;

wherein the plurality of optical fibers disposed in the fused section are stretched to provide a desired amount of optical coupling between each optical fiber; and wherein ~~The apparatus of claim 28, wherein~~ each optical fiber is adapted to receive an optical input from a plurality of optical inputs at the second end, and wherein the plurality of optical inputs are emitted into free space at the facet as a single combined optical output.

6. (canceled)

7. (original) The apparatus of claim 3, wherein the glass matrix is comprised of fluorosilicate.

8. (currently amended) The apparatus of claim ~~6~~28, wherein the optical input has a diameter, and wherein the diameter of the optical input at the first end of a given

optical fiber is larger than the diameter of the same optical input at the second end of the given optical fiber.

9. (original) The apparatus of claim 1, wherein the plurality of optical fibers disposed in the fused section are uniformly stretched to provide a desired amount of optical coupling between each optical fiber.

10. (previously presented) The apparatus of claim 28, wherein at least one optical fiber of the plurality of optical fibers has a different core size and/or refractive index from at least one other optical fiber of the plurality of optical fibers.

11. (currently amended) A method for coupling light comprising:

providing a plurality of optical fibers, each optical fiber having a first end, a second end, and a central core extending between the first and second end;

fusing the optical fibers together along a section of each optical fiber proximate the first end to form a fused section;

tapering the fused section of the optical fibers such that a core diameter of each optical fiber proximate the first end is smaller than the core diameter proximate the second end, wherein tapering the fused section comprises uniformly stretching the plurality of optical fibers to provide a desired amount of optical coupling between each optical fiber;

forming a facet by cutting and polishing or by cleaving ~~or cutting and polishing~~ said fused section in a direction perpendicular to the core; and

illuminating the facet with the light, wherein said illuminating further comprises: illuminating the facet with a single optical input traveling in free space; and

distributing the single optical input amongst each optical fiber in the plurality of optical fibers to provide a plurality of distributed optical outputs.

12. (original) The method of claim 11, further comprising the steps of:

arranging the plurality of optical fibers in an array; and

disposing the plurality of optical fibers in a glass matrix.

13. (currently amended) The method of claim ~~11~~12, wherein the array is selected from a member of the group consisting of hexagonal close packed arrays, square close packed arrays, and three-nearest neighbor packed arrays.

14. (currently amended) A method for coupling light comprising:

providing a plurality of optical fibers, each optical fiber having a first end, a second end, and a central core extending between the first and second end;

fusing the optical fibers together along a section of each optical fiber proximate the first end to form a fused section;

tapering the fused section of the optical fibers such that a core diameter of each optical fiber proximate the first end is smaller than the core diameter proximate the second end, wherein tapering the fused section comprises uniformly stretching the plurality of optical fibers to provide a desired amount of optical coupling between each optical fiber;

forming a facet by cutting and polishing or by cleaving said fused section in a direction perpendicular to the core; and

illuminating the facet with the light~~The method of claim 11~~, wherein said~~the step of~~ illuminating further comprises~~ the steps of~~:

providing an optical input at the second end of each optical fiber; and

emitting the optical inputs as a single combined optical output at the facet into free space.

15. (canceled)

16. (original) The method of claim 12, wherein the glass matrix comprises fluorosilicate.

17. (currently amended) The method of claim ~~15~~11, wherein the optical input has diameter, and wherein the diameter of the optical input at the first end of a given optical fiber is larger than the diameter of the same optical input at the second end of the given optical fiber.

18. (canceled)

19. (original) The method of claim 11, wherein at least one optical fiber of the plurality of optical fibers has a different core size and/or refractive index from at least one other optical fiber of the plurality of optical fibers.

20. (currently amended) An apparatus for coupling light comprising:

a plurality of single mode optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region; and

a facet, said facet being formed by cutting and polishing or by cleaving ~~or cutting and polishing~~ the tapered region in a direction perpendicular to said fiber axis, wherein the facet is adapted to receive a single optical input, the single optical input being distributed amongst each optical fiber in the plurality of optical fibers, wherein the optical input has a diameter, and wherein the diameter of the optical input at the first end of a given optical fiber is larger than the diameter of the same optical input at the second end of the given optical fiber; said facet having a cross section other than approximately equal to the cross section of an individual single-mode fiber.

21. (original) The apparatus of claim 20, wherein the plurality of optical fibers are arranged in an array, the array being selected from a member of the group consisting of hexagonal close packed arrays, square close packed arrays, and three-nearest neighbor packed arrays.

22. (original) The apparatus of claim 20, wherein the plurality of optical fibers are provided in a glass matrix.

23. (original) The apparatus of claim 20, wherein each optical fiber has a core diameter, the core diameter of each optical fiber in the tapered region being smaller than the core diameter of each optical fiber in a non-tapered region.

24. (original) The apparatus of claim 22, wherein the glass matrix is comprised of fluorosilicate.

25. (currently amended) The apparatus of claim 20, where the fibers have each a core and a cladding and a mode shape; the plurality of optical fibers in the fused section

are uniformly stretched to provide a desired amount of optical coupling between each optical fiber; and where the sum of the mode shapes of the fibers is calculated, and the core/cladding size ratio and stretch are selected, to maximize coupling of the free space beam into the core ensemble.

26. (original) The apparatus of claim 20, wherein at least one optical fiber of the plurality of optical fibers has a different core size and/or refractive index from at least one other optical fiber of the plurality of optical fibers.

27. (currently amended) A fiber optic apparatus comprising:

a plurality of single mode silica optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region; and

a facet, said facet being formed by cutting and polishing or by cleaving ~~or cut and polishing~~ said tapered region in a direction perpendicular to said fiber axis; wherein said facet has a cross section other than approximately equal to the cross section of an individual single-mode fiber.

28. (currently amended) A fiber optic apparatus comprising:

a plurality of optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region; and

a facet, said facet being formed by cutting and polishing or by cleaving ~~or cut and polishing~~ said tapered region ~~in a direction perpendicular to said fiber axis~~;

wherein the plurality of optical fibers disposed in the fused section are stretched to provide a desired amount of optical coupling between each optical fiber; wherein the facet is adapted to receive a single optical input traveling in free space, the fibers having each a core and a cladding and a mode shape, the sum of the mode shapes of the fibers being calculated, and the core/cladding size ratio and stretch being selected, to maximize coupling of the free space beam into the core ensemble; the single optical input being distributed amongst each optical fiber in the plurality of optical fibers.

29. (canceled)

30. (currently amended) The fiber optic apparatus of claim ~~29~~28, wherein said facet has a direction perpendicular to said fiber axis.

31. (new) The fiber optic apparatus of claim 27, where the fibers have each a core and a cladding and a mode shape; where the plurality of optical fibers in the fused section are uniformly stretched to provide a desired amount of optical coupling between each optical fiber; and where the sum of the mode shapes of the fibers is calculated, and the core/cladding size ratio and stretch are selected, to maximize coupling of the free space beam into the core ensemble.